

Spot Safety Project Evaluation

Project Log # 200505127

Spot Safety Project # 14-96-006-1

**Spot Safety Project Evaluation of the Guardrail Installation on NC 28
South of Highlands, 1.3 miles South of SR 1613 in Macon County.**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
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Principal Investigator

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11/23/2005
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 14-96-006-1 – The Guardrail Installation on NC 28 South of Highlands, 1.3 miles south of SR 1613 in Macon County.

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naïve before and after analysis has been completed to measure the effectiveness of the spot safety improvement. Additional analysis methods were not utilized for this evaluation because a suitable comparison group was unattainable. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of 600 feet of Guardrail on NC 28 south of Highlands, 1.3 miles south of SR 1613. NC 28 is a two-lane facility with a speed limit of 55 mph.

The initial crash analysis was completed from January 1, 1992 through May 31, 1995 with a total of six (6) reported crashes. The Six crashes were all Ran Off Road crashes. There was 1 Fatal injury, 1 class A injury and 3 class B injuries resulting from these crashes. The statement of the problem was a Pattern of Run Off Road accidents on this curvy segment of NC 28. The final completion date for the improvement at the subject Location was on December 31, 1998.

Naïve Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from November 1, 1998 through January 31, 1999. The before period consisted of reported crashes from September 1, 1992 through October 31, 1998 (6 Years, 2 Month) and the after period consisted of reported crashes from February 1, 1999 through March 31, 2005 (6 Years, 2 Month). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The treatment data consisted of all crashes on NC 28 from MP 2.47 to MP 3.07. A 0 feet Y-line was used in the analysis. Please see attached *Location Map* for further detail.

The following data Table 1 depicts the Naïve Before and After Analysis for the Total Crashes and Target Crashes at the treatment location. Table 2 provides an in depth examination of the Naïve

Before and After Analysis of the Total Crashes and Table 3 provides an in depth examination of the Naïve Before and After Analysis for the Guardrail Installation Target Crashes. Please note that the guardrail installation Target Crashes include the following crash types: Ran Off Road - Right, Ran Off Road - Left, Ran Off Road - Straight, Overturn/Rollover, Fixed Object, Head On, Sideswipe - Same Direction, and Sideswipe - Opposite Direction. Target Crashes are all potential Ran-Off Road crashes and include those crash types where at least one vehicle was involved in a lane departure.

Table 1. Treatment Information

	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	10	13	30.0
Total Severity Index	28.18	5.55	-80.3
Total Target Crashes	10	9	-10.0
Target Severity Index	28.18	6.76	-76.0
Volume	3400	3600	5.9

Table 2. Total Crashes Information

	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	10	13	30.0
Fatal Crashes	1	0	-100.0
Non Fatal Injury Crashes	8	8	0.0
Total Injury Crashes	9	8	-11.1
PDO Crashes	1	5	400.0
Fatal Injuries	1	0	-100.0
Non-Fatal Injuries	37	11	-70.3
Total Injuries	38	11	-71.1
Night Crashes	3	2	-33.3
Wet Crashes	3	3	0.0
Alcohol/ Drug Crashes	0	0	N/A

Table 3. Target Crashes Information

	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Target Crashes	10	9	-10.0
Fatal Crashes	1	0	-100.0
Non Fatal Injury Crashes	8	7	-12.5
Total Injury Crashes	9	7	-22.2
PDO Crashes	1	2	100.0
Fatal Injuries	1	0	-100.0
Non-Fatal Injuries	37	9	-75.7
Total Injuries	38	9	-76.3
Night Crashes	3	2	-33.3
Wet Crashes	3	3	0.0
Alcohol/ Drug Crashes	0	0	N/A
Guardrail Struck	0	1	N/A
Ran Off Road in a sharp curve crashes	10	5	-50.0

The naive before and after analysis at the treatment location resulted in a 30.0 percent increase in Total Crashes, an 80.3 percent decrease in the Total Severity Index, and a 5.9 percent increase in Average Daily Traffic (ADT). There was also a 10.0 percent decrease in Target Crashes and a 76.0 percent decrease in the Severity Index for Target Crashes. The before period ADT year was 1995 and the after period ADT year was 2002.

Results and Discussion

The naive before and after analysis involving the comparison of the treatment actual before data versus the treatment actual after data resulted in a 30.0 percent increase in Total Crashes and a 10.0 percent decrease in Target Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in Target Crashes and an increase in Total Crashes from the before to the after period.

As previously stated, the guardrail was installed to prevent vehicles running off the roadway in a sharp curve at the subject location. One Fatality occurred in the before period due to a vehicle running off the road in a sharp curve and striking a large tree. From the crash statistics it can be seen that the severity of both the Total and Target Crashes decreased significantly from the before to the after period and this can be attributed to the guardrail installation. Looking only at the Ran Off Road in a sharp curve crashes the guardrail installation has reduced this type of crashes by 50.0 percent from the before to the after period. Also, there was one crash which struck the guardrail in the after period. The overall results of the improvement may be considered satisfactory.

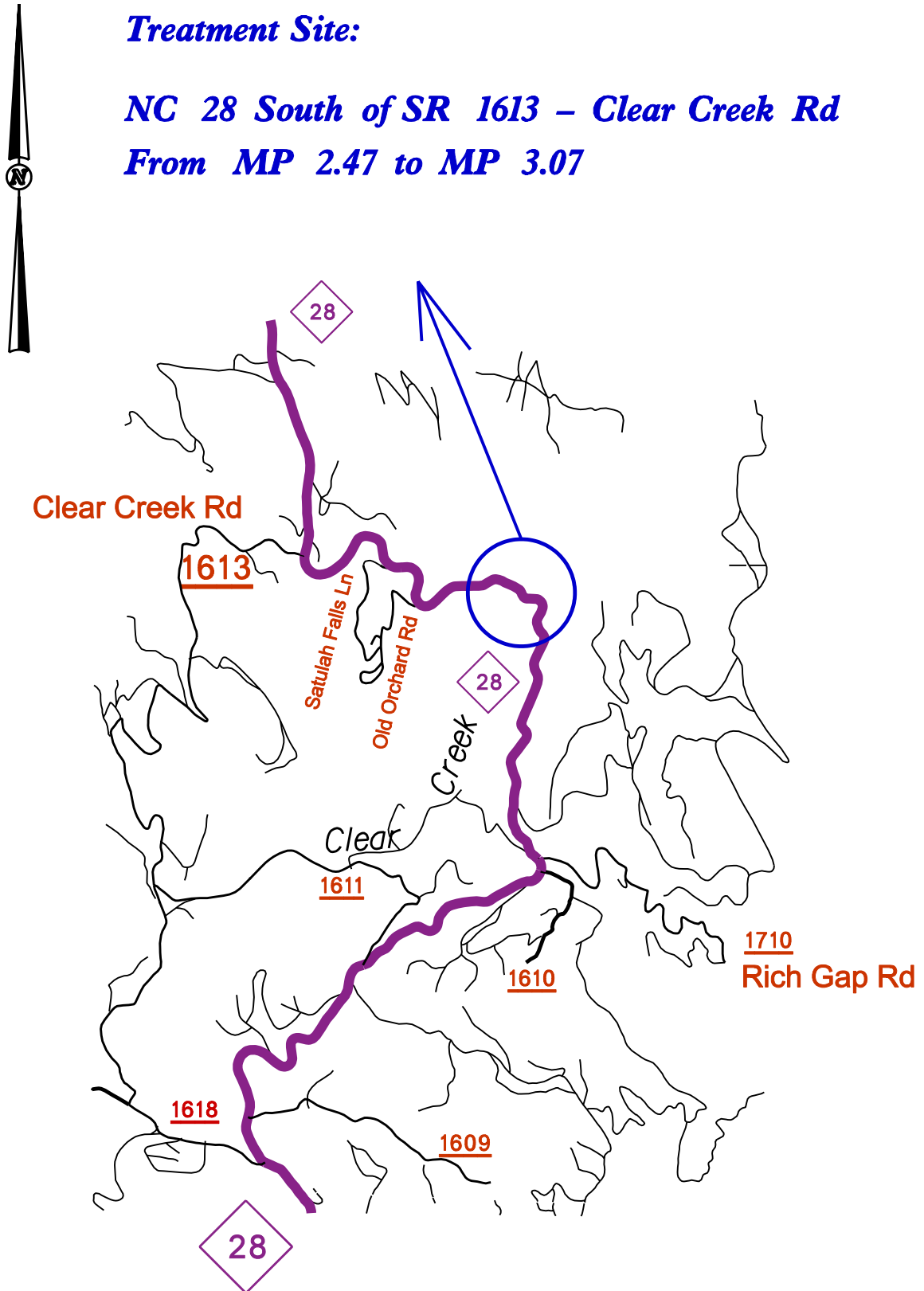
On a further note, the crash analysis was conducted on a 0.6 mile long strip of NC 28 near the guardrail installation. The guardrail placement was approximately in the middle of this strip. This strip was selected in order to include all crashes that were in the original engineering study that justified the improvement.

Evaluation of Spot Safety Project Number 14-96-006-1

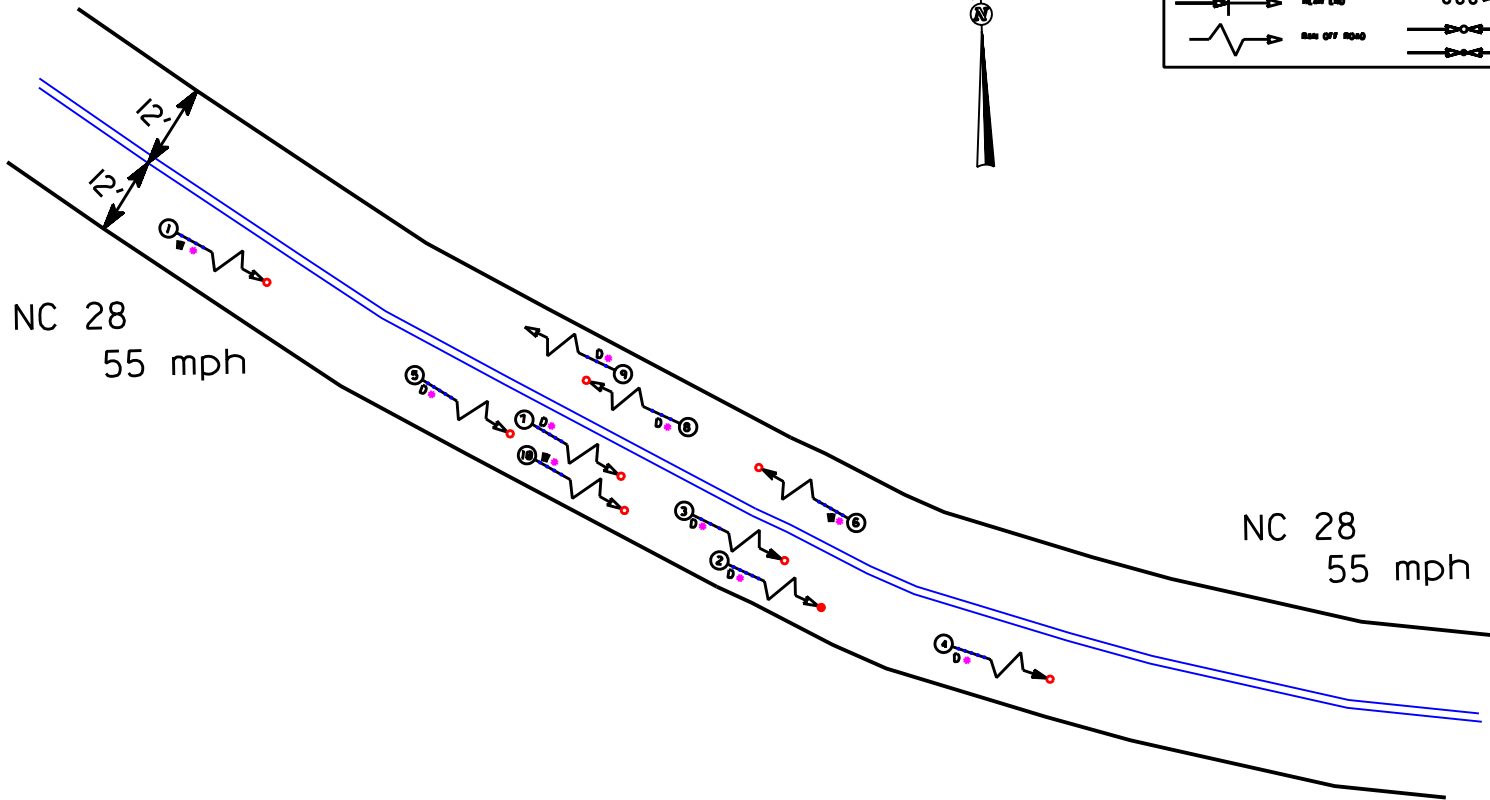
Location Map, Macon County

Treatment Site:

***NC 28 South of SR 1613 – Clear Creek Rd
From MP 2.47 to MP 3.07***



Macon County
NC 28 South of Highlands,
1.3 miles South of SR 1613-Clear Creek Rd
Treatment Site in The Before Period
From 9/1/1992 To 10/31/1998



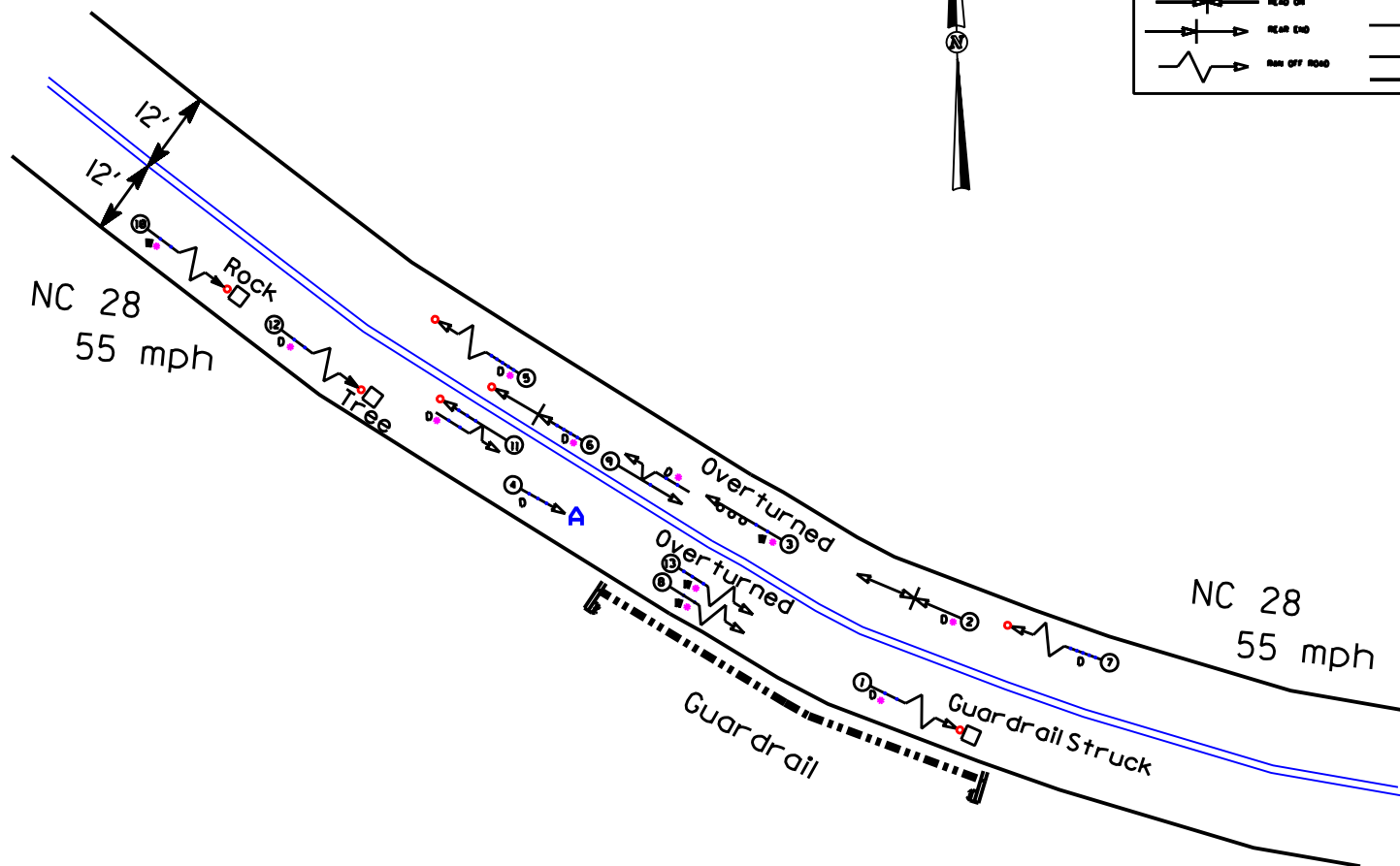
LEGEND			
	MOVING VEHICLE		ANGLE
	PEDESTRIAN		TURNING
	PAKED VEHICLE		BACKING
	PAKED VEHICLE		SLOPESIDE
	FIXED OBJECT		OUT OF CONTROL
	HEAD ON		REAR END
	RUN OFF ROAD		REAR END
			FATALITY
			9 MPH OR LESS
			10 MPH TO 19
			20 MPH TO 29
			30 MPH TO 39
			40 MPH TO 49
			50 MPH TO 59
			60 MPH TO 69
			70 AND UP
			SPEED UNKNOWN
			P PEDESTRIAN
			T TRAIN
			• DRIVER AT FAULT
			D DRY
			W WET
			I ICE OR SNOW
			O ONLY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: M	AREA:
	STUDY PERIOD: 9/1/1992 TO 10/31/1998	
	DISTANCE: 1-MILE + 0 FT	
	ANALYSIS PREPARED BY: Mojib Bozzori	
	ANALYSIS CHECKED BY: Mojib Bozzori	
	DIAGRAM PREPARED BY: Mojib Bozzori	
	DIAGRAM REVIEWED BY:	
SCALE:		NOT TO SCALE
DATE: 10/17/2005		
LOG NUMBER: 20050502 SS 14-96-006-1		

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH

Macon County
 NC 28 South of Highlands,
 1.3 miles South of SR 1613-Clear Creek Rd
 Treatment Site in The After Period
 From 2/1/1999 To 3/31/2005



LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		P PEDESTRIAN
	PARKED VEHICLE		TURNING		10 MPH TO 19		T TRAIN
	PARKING VEHICLE		BACKING		20 MPH TO 29		O DRIVER AT FAULT
	FIXED OBJECT		SIDESWIPE		30 MPH TO 39		D DRY
	HEAD ON		OUT OF CONTROL		40 MPH TO 49		W WET
	REAR END		HIT		50 MPH TO 59		I ICE OR SNOW
	RUN OFF ROAD		FATALITY		60 MPH TO 69		U SPEED UNKNOWN
					70 AND UP		O ONLY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: M	AREA:
	STUDY PERIOD: 2/1/1999 to 3/31/2005	
	DISTANCE: 1-LINE = 0 FT	
	ANALYSIS PREPARED BY: Mojib Bozzori	
	ANALYSIS CHECKED BY:	
	DIAGRAM PREPARED BY: Mojib Bozzori	
	DIAGRAM REVIEWED BY:	
	SCALE:	NOT TO SCALE
	DATE: 10/17/2005	
	LOG NUMBER: 20050521 SS M-96-006-1	

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